



# Bradycardia in a Setting of Uncontrolled Hypothyroidism

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## Introduction

- Sinus bradycardia and AV conduction defects are common manifestations of hypothyroidism
- The pertinent question in these situations is when to intervene with a permanent or temporary pacemaker placement
- Here we discuss a case of severe hypothyroidism causing clinically stable sinus bradycardia

## Case Presentation

- 50 year-old-male with a past medical history of hypothyroidism, bipolar disorder, generalized anxiety disorder, and medication non-compliance presented to the hospital with nausea and shoulder discomfort post fall
- He was evaluated and was noted to be severely bradycardic, with his heart rate consistently in the low 30s
- Labs were significant for TSH>100, FT4 - 0.2, FT3 - 0.7, Hb of 8.9, and ionized Ca of 1.06. EKG was done and showed sinus bradycardia.
- CT abdomen and pelvis without contrast was done and showed emphysematous gastritis, portal venous gas, and dilated loops of bowel
- The patient was admitted to the ICU for closer monitoring while surgery, cardiology, and endocrinology were consulted for further recommendations

## Discussion

- As the patient did not have any signs of gastric perforation, the surgeon recommended bowel rest, proton pump inhibitor therapy, and monitoring
- Cardiology evaluated the patient and attributed the bradycardia to hypothyroidism as the evaluation showed an intact chronotropic response
- The patient was hemodynamically stable and therefore no temporary pacemaker was indicated
- Meanwhile, endocrine was brought on board and he was started on IV levothyroxine 50mcg, with titrating the dose up to 150mcg IV, and eventually 175mcg PO at discharge. The patient was to do a thyroid function panel every four weeks.
- The patient's heart rate consistently improved and ranged in the 50s on discharge
- He was strongly counseled regarding the need for medication compliance to prevent complications in the future

## Conclusion

- There is a well-known correlation between hypothyroidism and cardiovascular pathologies <sup>(1)</sup>
- It directly affects the hemodynamics by altering the Ca-ATPase expression, the renin-angiotensin-aldosterone system, and systemic vascular resistance <sup>(2)</sup>
- Sinus bradycardia is often associated with hypothyroidism

- Symptomatic/unstable bradycardia and advanced second and third-degree AV blocks are indications of a permanent pacemaker placement, as per the current AHA/ACC guidelines. However, it is imperative to first correct the reversible causes like hypothyroidism, medication toxicities, etc. <sup>(3)</sup>
- Correction for severe hypothyroidism, such as in our patient, required IV replacement therapy with regular monitoring of the TSH/T4 levels periodically to assess response
- As evidenced by studies done by Kazim et. al, the majority of the patients had complete resolution of AV blocks after optimal hormone replacement <sup>(4)</sup>
- Temporary pacing can be considered if there is associated hemodynamic compromise and until there is a resolution of inciting factors
- Additionally, emphasis needs to be placed on patient education for medication compliance upon discharge to prevent recurrent hospitalizations and improve outcomes

## References

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